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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER

NANO, SARGON N

ART UNIT	PAPER NUMBER
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2157

DATE MAILED: 03/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/927,894

Applicant(s)

JEWETT ET AL.

Examiner

Sargon N Nano

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1- 52 is/are pending in the application.
- 4a) Of the above claim(s) 46 -52 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/26/01; 2/06/02</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to application filed on Aug. 10, 2001. Claims 1- 45 are pending examinations.

Election/Restrictions

2. Restriction is required under U.S.C. 121 and 372.

This application contains the following inventions groups of inventions, which are not linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CAR 1.499, applicant is required, in response to this action, to elect a single invention to which the claims must be restricted.

Group I, claims 1 – 45, drawn to class 709, subclass 226, Network Resource allocation.

Group II, claims 46 – 52 drawn to class 709, subclass 229, Network Resource Access Controlling.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II , restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Ronald Schaunbaum (Registration number 38,297) on Feb. 24, an election was made without traverse to prosecute the invention of Group I, claims 1 – 45.

Affirmation of this election must be made by applicant in replying to this office action. Claims 46 – 52 are withdrawn from further consideration by the examiner, 37 CFR 1.1142(b), as being drawn to non-elected invention.

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Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. The term "appears as" in claims 6 and 21 is a relative term which renders the claim indefinite. The term "appears as" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims, 1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 34, 37, 38, 40, 41, 42, 44 and 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Lerman et al U.S. Patent No. 6,378,063 (referred to here after as Lerman).

As to claim 1, Lerman teaches a block-level shared network storage system, comprising:

a storage server comprising an array of disk drives, and comprising a processor that runs a device driver to provide block-level access to data stored on the array of disk

drives (see col.1 lines 24 – 34 and fig. 1 Lerman discloses a plurality of disks for data storing).

a host computer coupled to the storage server by at least one computer network (see col. 3 lines 24 – 34 and fig. 1 Lerman discloses a computer that coupled to multiple disks); wherein the host computer and the storage server perform input/output (I/O) operations over the at least one network using multiple, concurrent logical connections such that a first I/O operation is executed over a first logical connection while a second I/O operation is executed over a second logical connection (see col. 3, line 51 – col. 4, line 33, and figs. 1 & 2 , Lerman discloses an input output operational network with multiple paths).

As to claim 4, Lerman teaches the network storage system as in claim 1, wherein each logical connection remains persistent over multiple I/O operations performed over that logical connection (see col.3, line 51 – col. 4, line 33, and figs. 1 & 2).

As to claim 5, Lerman teaches the network storage system as in claim 1, wherein the host computer is programmed to divide an I/O operation into multiple constituent I/O operations, and to perform the multiple constituent I/O operations in parallel over respective logical connections of said multiple, concurrent logical connections (see col.3, line 51 – col. 4, line 33, and figs. 1 & 2).

As to claim 6, Lerman teaches the network storage system as in claim 1, wherein the storage server provides virtualized block-level storage access to the host computer such that the block server appears as local disk drive storage to user-level processes running on the host computer (see col. 4 lines 34 – 44).

As to claim 7, Lerman teaches the network storage system as in claim 1, wherein the storage server is configurable to provide multiple storage partitions, each of which may be allocated to a different host computer (see col. 4 lines 34 – 44).

As to claim 8, Lerman teaches the network storage system as in claim 1, wherein the storage server has a first storage partition which is uniquely assigned to the host computer such that the first storage partition appears to user-level processes running on the host computer as a private, local disk drive (see col. 4 lines 34 – 44).

As to claim 9, Lerman teaches the network storage system as in claim 8, wherein the storage server further has a second storage partition which is uniquely assigned to a second host computer (see col. 4 lines 34 – 44).

As to claim 10, Lerman teaches the network storage system as in claim 8, wherein the storage server further has a second storage partition which is shared by multiple host computers(see col. 4 lines 34 – 44).

As to claim 11, Lerman teaches the network storage system as in claim 1, wherein the host computer and the storage server implement an authentication protocol in which the storage server authenticates the host computer before allowing the host computer to perform input/output operations (see col. 4 lines 16 – 28).

As to claim 12, Lerman teaches the network storage system as in claim 1, wherein the host computer and the storage server implement a discovery protocol in which the storage server notifies the host computer of partitions assigned to the host computer (see col. 2 lines 15 – 24).

As to claim 13, Lerman teaches the network storage system as in claim 1, wherein at least one of the logical connections is over a general-purpose computer network (see col. 3 lines 44 – 50 and fig.1).

As to claim 14, Lerman teaches the network storage system as in claim 1, wherein at least one of the logical connections is over an Ethernet network(see col. 3 lines 44 – 50 and fig.1).

As to claim 15, Lerman teaches the network storage system as in claim 1, wherein the first and second logical connections exist over separate computer networks (see col. Lines 34 – 49).

As to claim 16, Lerman teaches the network storage system as in claim 1, wherein each logical connection exists between a respective reader/writer pair (see col. Lines 34 – 49).

As to claim 17, Lerman teaches the network storage system as in claim 1, wherein the host computer and the storage server are interconnected by at least one switch (see col. 24 – 50).

As to claim 18, Lerman teaches the network storage system as in claim 1, wherein the host computer and the storage server each include two network interfaces that provide redundant network connections between the host computer and the storage server (see col.9, line58 – col. 10 line 14).

As to claim 34, Lerman teaches a method of executing an input/output (I/O) request received from a user-level process running on a host computer, comprising: on the host computer, dividing the I/O request into multiple constituent I/O operations; and

performing the multiple constituent I/O operations in parallel over multiple, respective logical network connections between the host computer and a target storage server such that I/O data is transferred between the host computer and the storage server over each of the logical network connections (see col. 3, line 51 – col. 4, line 33, and figs. 1 &2).

As to claim 37, Lerman teaches the method as in claim 34, wherein at least one of the logical network connections is over a general-purpose computer network (see col. 3 lines 44 – 50 and fig.1).

As to claim 38, Lerman teaches a storage server system that provides block-level storage for host computers over a computer network, the system comprising:

a storage server comprising a processor, an array of disk drives coupled to a controller, and a network interface for connecting the storage server to a computer network(see col.1 lines 24 – 34 and fig. 1 Lerman discloses a plurality of disks for data storing); and

a software system which provides functionality for subdividing storage space of the array of disk drives into multiple storage partitions, and provides functionality for uniquely allocating the partitions to host computers on the network such that the storage server may be shared by multiple host computers, and such that when a partition is allocated to a host computer, the partition appears to user-level processes of the host computer as a local disk drive(see col. 3, line 51 – col. 4, line 33, and figs. 1 &2 , Lerman discloses an input output operational network with multiple paths).

As to claim 40, Lerman teaches the storage server system as in claim 38, wherein the software system further comprises a configuration and management program which runs on the storage server and provides functionality for partitions to be created and assigned to hosts over the computer network using a web browser (see col. 4, line 34 – 49).

As to claim 41, Lerman teaches the storage server system as in claim 38, wherein the software system further provides functionality for allocating a partition to multiple host computers to permit sharing of partitions (see col. 4 lines 34 – 44).

As to claim 42, Lerman teaches the storage server system as in claim 38, wherein the partitions have a user-definable size (see col.7, line 18 – 28).

As to claim 44, Lerman teaches the storage server system as in claim 38, wherein the software system implements an authentication protocol in which the storage server authenticates host computers using a challenge-response protocol (see col. 4 lines 16 – 28).

As to claim 45, Lerman teaches the storage server system as in claim 38, wherein the software system implements a discovery protocol in which the storage server notifies the host computer of storage partitions assigned to the host computer(see col. 2 lines 15 – 24).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 39, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lerman and further in view of Bruno et al. U.S. Patent No. 6,725,456.

As to claim 2, Lerman teaches a storage server comprising an array of disk drives, and comprising a processor that runs a device driver to provide block-level access to data stored on the array of disk drives (see col. 1 lines 24 – 34 and fig. 1 Lerman discloses a plurality of disks for data storing).

a host computer coupled to the storage server by at least one computer network(see col. 3 lines 24 – 34 and fig. 1 Lerman discloses a computer that coupled to multiple disks) ; wherein the host computer and the storage server perform input/output (I/O) operations over the at least one network using multiple, concurrent logical connections such that a first I/O operation is executed over a first logical connection while a second I/O operation is executed over a second logical connection(see col. 3, line 51 – col. 4, line 33, and figs. 1 & 2 , Lerman discloses an input output operational network with multiple paths).

Lerman does not explicitly teach the connection is a socket connection, however Bruno teaches a network connection is a socket connection. It would have been obvious to one of the ordinary skill in the art at the time of the invention was made to include a socket connection because socket services are relatively simple to configure and manage and are adequate for most application and therefore using socket

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communication would make it easier for administrator to facilitate access requests to a storage device.

As to claim 3, Lerman and Bruno do not explicitly teach TCP/IP protocol. Official notice is taken as evident by Microsoft computer Dictionary that it would have been obvious for one of the ordinary skill in the art at the time of the invention to use TCP/IP because doing so would enable communication over a network by incorporating more than 100 standards.

As to claim 19, Lerman teaches a system for storing data for host computers, comprising:

a plurality of storage servers connected to a network, each storage server comprising an array of disk drives, an array controller, and a processor(see col.1 lines 24 – 34 and fig. 1);

a plurality of host computers connected to the network and programmed to store data on the storage servers(see col. 3 lines 24 – 34 and fig. 1); and

at least one switch which interconnects the plurality of storage servers with the plurality of host computers; wherein each host computer is programmed to open multiple concurrent over the network to the storage servers for performing concurrent input/output operations(see col. 3, line 51 – col. 4, line 33, and figs. 1 &2).

Lerman does not explicitly teach the connection is a socket connection, however Bruno teaches a network connection is a socket connection. It would have been obvious to one of the ordinary skill in the art at the time of the invention was made to include a socket connection because socket services are relatively simple to configure and

manage and are adequate for most application and therefore using socket communication would make it easier for administrator to facilitate access requests to a storage device.

As to claim 20, Lerman and Bruno do not explicitly teach TCP/IP protocol. Official notice is taken as evident by Microsoft computer Dictionary that it would have been obvious for one of the ordinary skill in the art at the time of the invention to use TCP/IP because doing so would enable communication over a network by incorporating more than 100 standards.

As to claim 21, Lerman teaches the system of claim 19, wherein each storage server of the plurality of storage servers provides virtualized block-level storage access to the host computers such that the block servers appear as local disk drive storage to user-level processes running on the host computers (see col. 4 lines 34 – 44).

As to claim 22, Lerman teaches the system of claim 19, wherein at least a first host computer of the plurality of host computers is programmed to divide an I/O operation into multiple constituent I/O operations, and to perform the multiple constituent I/O operations in parallel over respective logical connections between the first host computer and a target storage server (see col.3, line 51 – col. 4, line 33, and figs. 1 & 2).

As to claim 23, Lerman teaches the system of claim 19, wherein a first storage server of the plurality of storage servers is configurable to provide multiple, variable-size partitions, each of which may be allocated to a different host computer of the plurality of host computers (see col. 4 lines 34 – 44).

As to claim 24, Lerman teaches the system of claim 19, wherein a first storage server of the plurality of storage servers has a first partition which is uniquely assigned to a first host computer of the plurality of host computers such that the first partition appears as a local disk drive to the first host computer (see col. 4 lines 34 – 44).

As to claim 25, Lerman teaches the system of claim 24, wherein the first storage server further has a second partition which is uniquely assigned to a second host computer of the plurality of host computers (see col. 4 lines 34 – 44).

As to claim 26, Lerman teaches the system of claim 19, wherein the host computers and the storage servers implement an authentication protocol in which a storage server authenticates a host computer before allowing the host computer to perform input/output operations (see col. 4 lines 16 – 28).

As to claim 27, Lerman teaches the system of claim 19, wherein the host computers and the storage servers implement a discovery protocol in a storage server notifies a host computer of partitions assigned to the host computer (see col. 2 lines 15 – 24).

As to claim 28, Lerman teaches a method of performing input/output operations, comprising: establishing first and second connections between a host computer and a block-level storage server over one or more computer networks; performing a first input/output operation over the first connection while performing a second input/output operation over the second connection, each of said input/output operations comprising a transfer of input/output data between the host computer and the storage server; and maintaining the first and second connections in a persistent state such that each

connection may be used to perform additional input/output operations (see col. 3, line 51 – col. 4, line 33, and figs. 1 & 2).

Lerman does not explicitly teach the connection is a socket connection, however Bruno teaches a network connection is a socket connection. It would have been obvious to one of the ordinary skill in the art at the time of the invention was made to include a socket connection because socket services are relatively simple to configure and manage and are adequate for most application and therefore using socket communication would make it easier for administrator to facilitate access requests to a storage device.

Lerman and Bruno do not explicitly teach TCP/IP protocol. Official notice is taken as evident by Microsoft computer Dictionary that it would have been obvious for one of the ordinary skill in the art at the time of the invention to use TCP/IP because doing so would enable communication over a network by incorporating more than 100 standards.

As to claim 29, Lerman teaches the method as in claim 28, wherein the first and second connections are established over separate computer networks.

As to claim 30, Lerman teaches the method as in claim 28, wherein the first input/output operation is a first I/O request issued from a first application running on the host computer, and the second input/output operation is a second I/O request issued from a second application running on the host computer (see col.3, line 51 – col. 4, line 33, and figs. 1 & 2).

As to claim 31, Lerman teaches the method as in claim 28, wherein the first and second input/output operations are constituent operations of an I/O request issued by a

process running on the host computer, whereby the I/O request is executed in parallel over multiple connections (see col.3, line 51 – col. 4, line 33, and figs. 1 & 2).

As to claim 32, Lerman teaches the method as in claim 28, further comprising establishing a third connection between the host computer and the storage server, and using the third connection to perform an authentication sequence in which the storage server authenticates the host computer (see col. 4 lines 16 – 28).

As to claim 33, Lerman teaches the method as in claim 32, further comprising conveying access information over the third connection from the storage server to the host computer, said access information specifying access rights uniquely assigned to the host computer (see col. 4 lines 34 – 44).

As to claim 35, Lerman teaches a storage server comprising an array of disk drives, and comprising a processor that runs a device driver to provide block-level access to data stored on the array of disk drives (see col.1 lines 24 – 34 and fig. 1 Lerman discloses a plurality of disks for data storing).

a host computer coupled to the storage server by at least one computer network(see col. 3 lines 24 – 34 and fig. 1 Lerman discloses a computer that coupled to multiple disks) ; wherein the host computer and the storage server perform input/output (I/O) operations over the at least one network using multiple, concurrent logical connections such that a first I/O operation is executed over a first logical connection while a second I/O operation is executed over a second logical connection(see col. 3, line 51 – col. 4, line 33, and figs. 1 & 2 , Lerman discloses an input output operational network with multiple paths).

Lerman does not explicitly teach the connection is a socket connection, however Bruno teaches a network connection is a socket connection. It would have been obvious to one of the ordinary skill in the art at the time of the invention was made to include a socket connection because socket services are relatively simple to configure and manage and are adequate for most application and therefore using socket communication would make it easier for administrator to facilitate access requests to a storage device.

As to claim 36, Lerman and Bruno do not explicitly teach TCP/IP protocol. Official notice is taken as evident by Microsoft computer Dictionary that it would have been obvious for one of the ordinary skill in the art at the time of the invention to use TCP/IP because doing so would enable communication over a network by incorporating more than 100 standards.

As to claim 39, Lerman teaches the storage server system as in claim 38, wherein the software system comprises a host driver component which runs on the host computers, and comprises a server driver component executed by the processor of the storage server, wherein the host and server driver components communicate over the computer network via connections (see col.1 lines 24 – 34 and fig. 1).

Lerman does not explicitly teach the connection is a socket connection, however Bruno teaches a network connection is a socket connection. It would have been obvious to one of the ordinary skill in the art at the time of the invention was made to include a socket connection because socket services are relatively simple to configure and manage and are adequate for most application and therefore using socket

communication would make it easier for administrator to facilitate access requests to a storage device.

Lerman and Bruno do not explicitly teach TCP/IP protocol. Official notice is taken as evident by Microsoft computer Dictionary that it would have been obvious for one of the ordinary skill in the art at the time of the invention to use TCP/IP because doing so would enable communication over a network by incorporating more than 100 standards.

As to claim 43, Lerman teaches the storage server system as in claim 38, wherein the software system supports the ability for a host computer to concurrently perform multiple input/operations over multiple, respective connections to the storage server(see col. 3, line 51 – col. 4, line 33, and figs. 1 &2).

Lerman does not explicitly teach the connection is a socket connection, however Bruno teaches a network connection is a socket connection. It would have been obvious to one of the ordinary skill in the art at the time of the invention was made to include a socket connection because socket services are relatively simple to configure and manage and are adequate for most application and therefore using socket communication would make it easier for administrator to facilitate access requests to a storage device.

Lerman and Bruno do not explicitly teach TCP/IP protocol. Official notice is taken as evident by Microsoft computer Dictionary that it would have been obvious for one of the ordinary skill in the art at the time of the invention to use TCP/IP because doing so would enable communication over a network by incorporating more than 100 standards.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Data Packet Processing System And Method For A Router by Irwin U.S. Patent No. 6,393,026.
- Virtual Ports For Data Transferring of A Data Storage System.by Blumenau et al U.S. Patent No.6,421,711.
- Distribution Multimedia Service System Shared Disk Arrays Connected In A Chain And Having Two Ports Each That Are Striped With Digitalized Video Data. By Uchihori U.S. Patent No. 5,996,014.

Multi – Server file Download by Feigenbaum U.S. Patent No. 6,339,785.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sargon N Nano whose telephone number is (571) 272-4007. The examiner can normally be reached on 8 hour.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571) 272-4001. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sargon nano
Feb. 25, 2005



SALEH NAJJAR
PRIMARY EXAMINER